The Prairie Astronomer

February, 2013 Volume 54, Issue #2

The Official Newsletter of the Prairie Astronomy Club

February Program

Club President Jason Noelle misspoke when he said Jack Gable would be the speaker for the February meeting but he will be at the March meeting. So we will be showing "Ring World" about Saturn and Jack will be discussing the recent Russian Meteor with a Skype conversation with Rob Landis.

In This Issue:

NGC 4731 is a very strange, distorted galaxy on the far side of the Virgo Cluster, about 65 million light-years distant though red shift puts it far closer. Most sources attribute its distorted shape to it interacting with nearby NGC 4697 well out of my image to the northwest. Even though it is a member of the Virgo Cluster, a region rich in galaxies and far from the dust of our Milky Way, it is just outside of the area covered by the Sloan Digital Sky Survey.

Image Credit: PAC Club Member Rick Johnson

Featured Photo

The Bad Astronomer Fact of the Month

158 known gorgeous stellar beehives called globular clusters orbit our galaxy.

Globular clusters have always been one of my favorite astronomical objects. These balls of stars — sometimes hundreds of thousands strong — are easy targets through a small telescope and are fun and beautiful to see.

But when you train a big space telescope on them, well, their beauty is magnified spectacularly:

This Hubble image shows NGC 6934, an ancient ball of stars located about 50,000 light years away. Globular clusters are made of stars that are bound to each other gravitationally and orbiting the center on a myriad different paths — think of it as a beehive except with a hundred thousand bees each a million kilometers across. There are about 150 of these guys orbiting the Milky Way, each a dozen or so light years across and containing upwards of a million stars. NGC 6934 is pretty typical of its class, but its great distance dims it to near-obscurity. If it were as close as M 13 or Omega Centauri — both roughly half as far as NGC 6934 — it would be heralded as a gem of the night sky.

Globulars are old. We think they form all at once, with all the stars being born at the same time. Massive stars, which are blue, don't live long before exploding as supernovae (leaving behind black holes or dense neutrons stars), so they're all long gone in these billions-of-years-old objects. In fact, in many globulars even stars like the Sun are gone, having used up their fuel and faded away. All that's left are low mass stars, which means all that remains are red stars.

So why are there so many blue stars in this picture? Ah, it's false color! It was taken through two filters, one in the red, and the other in the infrared. In the picture, the red filter image is colored blue, and the infrared one is colored red. Note that the brightest stars in the picture are red (meaning they're bright in the infrared); this is because these are red giants, stars that are nearing the ends of their lives. They've swollen up and cooled off, glowing brilliantly.

Even though they're not actually blue, the ones that look blue in the image are most likely the "normal" stars that are left in the cluster, that is, stars still fusing hydrogen into helium like the Sun is, and are not yet red giants.

Globular clusters like NGC 6934 are incredibly important to our understanding of our galaxy. Because all their stars formed at once and all from the same cloud of gas, they're a laboratory experiment in astronomy! We don't have to correct for age or composition of stars (or at least not very much) allowing us to examine other characteristics. They're located all over the sky, so they're always around for viewing, and many are isolated in space, making them easy to examine. Much of what we've learned about how stars age and die was gleaned from globulars like NGC 6934.

Globular clusters tell us secrets of the Universe, and all we have to do is pay attention. And when they're as stunningly beautiful as this one, that's really easy to do.

You can read more from the Bad Astronomer at his blog: http://www.slate.com/blogs/bad_astronomy.html

Club Events

Newsletter submission deadline March 15, 2013

PAC Meeting
Tuesday February 26th, 2013 @Hyde Observatory
TBA

PAC Meeting
Tuesday March 26th, 2013 @Hyde Observatory
Prof. Jack Gable of Creighton University

Astronomy Day
April 20, 2013

2013 PAC Star Party Dates - Dates in bold are closest to the new moon

January	Jan 4th	**Jan 11th**
February	Feb 1st	**Feb 8th**
March	Mar 1st	**Mar 8th**
April	Apr 5th	**Apr 12th**
May	May 3rd	**May 10th**
June	May 31st	**Jun 7th**
July	Jun 28th	**Jul 5th**
NSP	**Aug 4-9**	
August	Aug 2nd	**Aug 9th**
September	Aug 30th	**Sep 6th**
October	Sep 27th	**Oct 4th**
November	Oct 25th	**Nov 1st**
December	Nov 29th	**Dec 6** and 27th

Lunar Party Dates:

Apr 19th
May 17th

Aug 16th
Sep 13th
Oct 11th

Internet Links of Interest

http://www.universetoday.com/

http://www.thespacereview.com

http://www.thespacereview.com/article/1945/1

http://space.flatoday.net/

http://www.spaceportamerica.com/

http://www.planetary.org/home/

http://www.nasaspaceflight.com/

http://www.spacex.com

ON THE NET

PAC:
www.prairieastronomyclub.org

PAC E-Mail:
info@prairieastronomyclub.org

NSP:
www.nebraskastarparty.org

NSP E-Mail:
info@nebraskastarparty.org

OAS
www.OmahaAstro.com

Hyde Observatory
www.hydeobservatory.info

Panhandle Astronomy Club
Panhandleastronomyclub.com

PAC-LIST: You may subscribe to the PAC listserv by sending an e-mail message to: imailsrv@prairieastronomyclub.org. In the body of the message, write "Subscribe PAC-List your-email-address@your-domain.com"

For example:
Subscribe pac-list me@myISP.com

To post messages to the list, send to the address

pac-list@prairieastronomyclub.org

PAC can also be found on Twitter and Facebook.

Buy club apparel through the club website. Shirts, hats, mugs, mouse pads and more.

January/February Observing: What to View--Jim Kvasnicka

Planets

Jupiter: Jupiter will dim from magnitude -2.3 to -2.1 and in size from 39" to 36".

Saturn: Rises between 10 and 11 pm in Libra at magnitude 0.3. The rings remain a fine sight tilted 18.8º.

Venus/Mercury/Mars/Uranus/ Neptune: All are not visible this month.

Comets

PanSTARRS (C/2011 L4): The best observing is expected from March 8-20. Current predictions put it at magnitude -0.2 on March 10th. On April 4th it passes 2º west of M31.

Messier List

M41: Open cluster in Canis Major.
M44: Open cluster in Cancer.
M46/M47: Open clusters in Puppis.
M48: Open cluster in Hydra.
M50: Open cluster in Monoceros.
M67: Open cluster in Cancer.
M81/M82: Galaxy pair in Ursa Major.
M93: Open cluster in Puppis.
Last Month: M1, M35, M36, M37, M38, M42, M43, M45, M78, M79
Next Month: M40, M65, M66, M95, M96, M105, M106, M108, M109

NGC and Other Deep Sky Objects

Mel 71: Open cluster in Puppis, resembles a loose globular cluster.
NGC 2342: The Ghost of Jupiter, PN in Hydra.
NGC 2440: PN in Puppis.
NGC 2477: Bright open cluster in Puppis.
NGC 3621: Galaxy in Hydra.

Double Star Program List

Epsilon Canis Majoris: Bright white and blue-white stars.

Delta Geminorum: Wasat, Yellow and a pale-rose colored pair.

Alpha Geminorum: Castor, White primary with a yellow secondary.

12 Lyncis: Close pair of yellow-white stars.

19 Lyncis: White pair.

38 Lyncis: White primary with a yellow secondary.

Zeta Cancri: Yellow and pale yellow pair.

Iota Cancri: Yellow and pale blue pair.

Basic Astronomy

Jim Kvasnicka - Club Observing Chair

I would like to spend some time on basic astronomy terminology to benefit the new members of the club or those new to astronomy. I would like to start by looking at magnitude.

Magnitude: A numerical measure of the relative brightness of an object in the sky. Brighter objects have a lower magnitude value.

We use the term magnitude all the time in astronomy but how many of us really understand the magnitude values we see for an object. If Jupiter shines brightly at a magnitude -2.3 and Saturn is at magnitude 0.3 what does that tell me?

A one magnitude jump is equal to a change in brightness of 2.512 times. A 1.0 magnitude star is 2.512 times brighter than a 2.0 magnitude star. That same 1.0 magnitude star is 6.3 times brighter than a 3.0 magnitude star, 2.512 x 2.512 = 6.3. That same 1.0 magnitude star is 15.85 times brighter than a 4.0 magnitude star, 2.512 x 2.512 x 2.512 = 15.85. A five magnitude jump is equal to a change in brightness of 100 times. A ten magnitude jump is equal to a change in brightness of 10,004 times.

If Jupiter is at magnitude -2.3 and Saturn is at magnitude 0.3 then that tells me that Jupiter has a magnitude 2.6 times greater than Saturn. $2.512^{2.6} = 10.96$. Jupiter is approximately 11 times brighter than Saturn.

Integrated Magnitude: Total brightness of an extended body.

Extended objects like galaxies, star clusters, and nebulae have integrated magnitudes. This is the magnitude they would have if all their light was concentrated to a single point like a star. These types of objects may have a magnitude listed that does not seem that faint. However, because the object size is spread out over some distance the magnitude could be misleading, especially to those new to astronomy. Because of the size the object may have a low surface brightness making it difficult to see or detect. A good example is M33, the Pinwheel Galaxy in Triangulum. M33 has a listed magnitude of 5.7 but it's spread out over a large area making it very difficult to see. In a 10 inch telescope M33 will cover an area of 50' x 30'. This large area will appear as a very dim glow in your telescope. Those new to the hobby of astronomy will pass over M33 numerous times before they see it.

Keep this in mind when you are looking for galaxies, star clusters, and nebulae. Don't let the listed magnitude of the object fool you into expecting something much brighter than what you will actually see. This is most notable for galaxies.

ANNUAL MEMBERSHIP

REGULAR MEMBER - $30.00 per year. Includes club newsletter, and 1 vote at club meetings, plus all other standard club privileges.

FAMILY MEMBER - $35.00 per year. Same as regular member except gets 2 votes at club meetings.

If you renew your membership prior to your annual renewal date, you will receive a 10% discount.

Club members are also eligible for special subscription discounts on Sky & Telescope Magazine.

Club Telescopes

To check out one of the club telescope contact **Ben Rush.** If you keep a scope for more than a week, please check in with Ben once a week, to verify the location of the telescope and how long you plan to use it. The checkout time limit will be two weeks, but can be extended if no one else has requested use of a club scope.

100mm Orion refractor:
Available

10 inch Meade Dobsonian:
Available

13 inch Truss Dobsonian:
Available

Rare Explosion Created Our Galaxy's Youngest Black Hole, Study Suggests

-Sciencedaily.com

New data from NASA's Chandra X-ray Observatory suggest a highly distorted supernova remnant may contain the most recent black hole formed in the Milky Way galaxy. The remnant appears to be the product of a rare explosion in which matter is ejected at high speeds along the poles of a rotating star. The remnant, called W49B, is about a thousand years old as seen from Earth and located about 26,000 light-years away.

"W49B is the first of its kind to be discovered in the galaxy," said Laura Lopez, who led the study at the Massachusetts Institute of Technology. "It appears its parent star ended its life in a way that most others don't."

Usually when a massive star runs out of fuel, the central region of the star collapses, triggering a chain of events that quickly culminate in a supernova explosion. Most of these explosions are generally symmetrical, with the stellar material blasting away more or less evenly in all directions.

However, in the W49B supernova, material near the poles of the doomed rotating star was ejected at a much higher speed than material emanating from its equator. Jets shooting away from the star's poles mainly shaped the supernova explosion and its aftermath.

The remnant now glows brightly in X-rays and other wavelengths, offering the evidence for a peculiar explosion. By tracing the distribution and amounts of different elements in the stellar debris field, researchers were able to compare the Chandra data to theoretical models of how a star explodes. For example, they found iron in only half of the remnant while other elements such as sulfur and silicon were spread throughout. This matches predictions for an asymmetric explosion.

"In addition to its unusual signature of elements, W49B also is much more elongated and elliptical than most other remnants," said co-author Enrico Ramirez-Ruiz of the University of California at Santa Cruz. "This is seen in X-rays and several other wavelengths and points to an unusual demise for this star." Because supernova explosions are not well understood, astronomers want to study extreme cases like the one that produced W49B. The relative proximity of W49B also makes it extremely useful for detailed study.

The authors examined what sort of compact object the supernova explosion left behind. Most of the time, massive stars that collapse into supernovas leave a dense, spinning core called a neutron star. Astronomers often can detect neutron stars through their X-ray or radio pulses, although sometimes an X-ray source is seen without pulsations. A careful search of the Chandra data revealed no evidence for a neutron star. The lack of such evidence implies a black hole may have formed.

"It's a bit circumstantial, but we have intriguing evidence the W49B supernova also created a black hole," said co-author Daniel Castro, also of MIT. "If that is the case, we have a rare opportunity to study a supernova responsible for creating a young black hole." Supernova explosions driven by jets like the one in W49B have been linked to gamma-ray bursts (GRBs) in other objects. GRBs, which have been seen only in distant galaxies, also are thought to mark the birth of a black hole. There is no evidence the W49B supernova produced a GRB, but it may have properties -- including being jet-driven and possibly forming a black hole -- that overlap with those of a GRB.

The new results on W49B, which were based on about two-and-a-half days of Chandra observing time, appear in a recent issue of the *Astrophysical Journal.*

Challenge Observing Objects for January/February

Each month I will have two objects, one for the more seasoned observer and one for the beginning observer. Each object I hope will challenge you just a little bit. I will provide you with a little bit of information about the object. It is your job to find it and if you would write a little report or draw what you see. The first person to report back on each object will have their report published in the next issue of the newsletter. Happy Hunting!

Advanced Object

NGC 2298

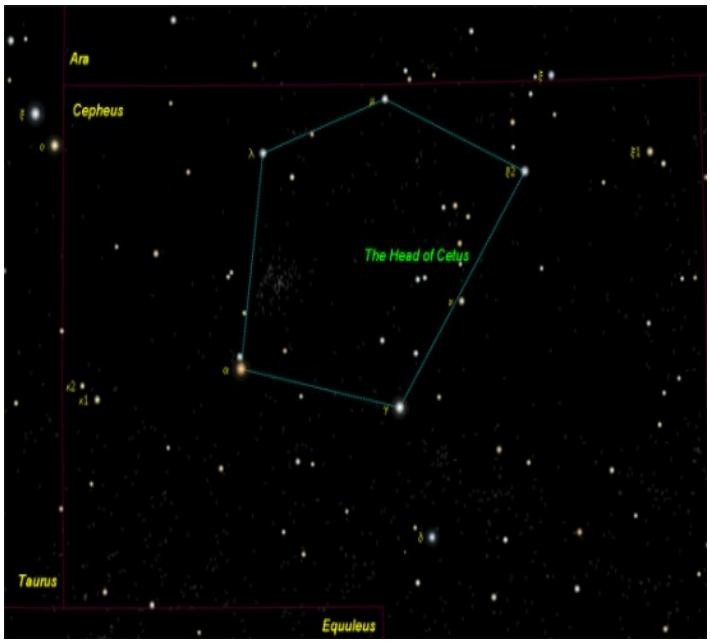
A class VI globular cluster in Puppis. It's situated in a rich Milky Way field with a faint 3' diameter halo. Lies about 35,000 light years from earth. Could be a former member of the Canis Major Dwarf Galaxy. Its apparent magnitude of 9.3.

Image Credit: NASA

Beginner Object

Cosmic Question Mark

Nu Ceti sits at the bottom of this asterism. Nu is the point while 5 6th to 7th magnitude stars to the north to make the rest of the question mark. It stands about 2 degrees from top to bottom. The whole asterism is located within the head of Cetus.



A look back at our January Meeting

Despite the weather being snowy, we had four people bring telescopes looking for some help. We had presentations on Collimation and finder scope alignment, accessories, and reading star charts. We also had 20 minutes of some hands-on work between club members and guests. We did gain 2 members!


LEGEND

THE *Prairie Astronomy Club*

Amateur Astronomy --
A Hobby as Big as the Universe

The Prairie Astronomer is published monthly by the Prairie Astronomy Club, Inc. Membership expiration date is listed on the mailing label. Membership dues are: **Regular $30/yr, Family $35/yr**. Address all new memberships and renewals to: **The Prairie Astronomy Club, Inc., PO Box 5585, Lincoln, NE 68505-0585**. For other club information, please contact one of the club officers listed to the right. Newsletter comments and articles should be submitted to: **Jason Noelle at jason.noelle@gmail.com,** no less than ten days prior to the club meeting. The Prairie Astronomy Club meets the last Tuesday of each month at Hyde Memorial Observatory in Lincoln, NE.

FIRST CLASS MAIL

Next PAC Meeting
Tuesday
March 26 , 2012
7:30 PM
Hyde Observatory